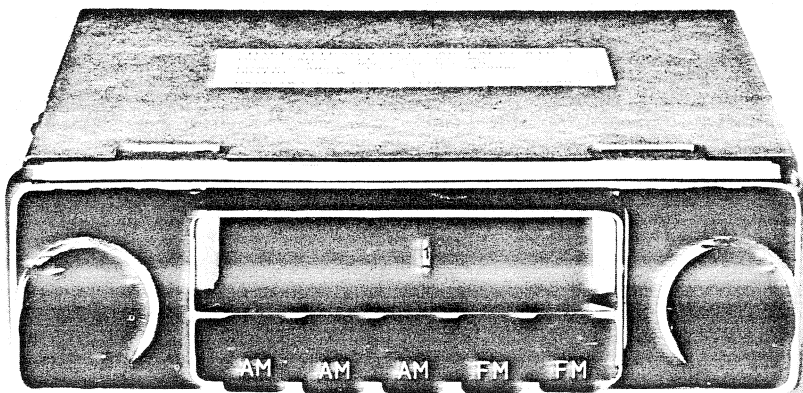




Service Manual



MODEL

ATR-932

SPECIFICATIONS

Frequency Range

AM	520 ~ 1620kHz
FM	88 ~ 108MHz

Intermediate Frequency

AM	452kHz
FM	10.7MHz

Power Supply

DC	12V Car Battery (\pm Earth Changeable)
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Power Output

5W

Speaker

5" (12 cm) P.D.S. 4 ohm

Dimensions

6-1/4"(W) \times 2"(H) \times 5-1/8"(D)
(160mm(W) \times 50mm(H) \times 130mm(D))

Weight

3.3 lbs. (1.5 kg)

Transistor Complement

Q1	2SC535A	FM RF Amplifier
Q2	2SC535A	FM Mixer
Q3	2SC461B	FM Oscillator
Q4	2SC460A	1st FM IF Amplifier & AM RF Amplifier
Q5	2SC460A	2nd FM IF Amplifier & AM Converter
Q6	2SC460B	3rd FM IF Amplifier & 1st AM IF Amplifier
Q7	2SC460B	4th FM IF Amplifier & 2nd AM IF Amplifier
Q8	2SC458B	Audio Amplifier
Q9	2SC458B	Audio Driver
Q10, Q11	2SC1013② ..	Audio Output

GENERAL DESCRIPTION

The circuitry used in this car radio incorporates 11 transistors and 12 diodes. An external antenna feeds the AM broadcasting signal to the converter. After going through 2 IF amplifiers and 1 diode detector, the signal passes through the 4 transistor audio amplifier circuit.

An external antenna feeds the FM broadcasting signal to the RF amplifier. After going through 4 IF amplifiers and 2 diode detectors, the signal passes through the 4 transistor audio amplifier circuit.

An AM AVC voltage is fed back to the RF amplifier and 1st IF amplifier.

An AFC voltage is fed back to the FM oscillator.

CHASSIS REMOVAL

1. Remove the screws retaining the top and bottom covers on the bottom of the cabinet, and then remove the top and bottom covers.
2. Remove the printed circuit board connecting lead from the printed circuit board.
3. Remove a screw retaining the radiation panel on the bottom the cabinet.
4. Remove the screws retaining the printed circuit board.
5. Remove the printed circuit board from the cabinet.

SHARP CORPORATION OSAKA, JAPAN

ALIGNMENT INSTRUCTIONS

Should it become necessary at any time to check the alignment of this receiver, proceed as follows;

- 1) Connect an output meter across the speaker voice coil lugs.
- 2) Set the volume control to maximum.
- 3) Attenuate the signals from the generator enough to swing the most sensitive range of the output meter.
- 4) Use a non-metallic alignment tool.
- 5) Repeat adjustments to insure good results.

AM ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RECEIVER		ADJUSTMENT
	CONNECTION TO RECEIVER	INPUT SIGNAL FREQUENCY	DIAL SETTING	REMARKS	
1	Connect signal generator through a dummy to an external antenna. Connect ground lead to the receiver chassis. (Refer to Figure 1)	Exactly 452kHz (400Hz, 30%, AM modulated)	Tuning gang fully open. (minimum inductance)	Adjust for maximum output on speaker voice coil lugs.	T7 T8 T9
2	Same as Step 1.	Exactly 515kHz (400Hz, 30%, AM modulated)	Tuning gang fully closed. (maximum inductance)	Same as Step 1.	L10
3	Same as Step 1.	Exactly 1640kHz (400Hz, 30%, AM modulated)	Tuning gang fully open. (minimum inductance)	Same as Step 1.	C5
4	Same as Step 1.	Exactly 1400kHz (400Hz, 30%, AM modulated)	1400kHz	Same as Step 1.	C2 C4
5	Repeat Steps 2, 3 and 4 until no further improvement is obtained.				

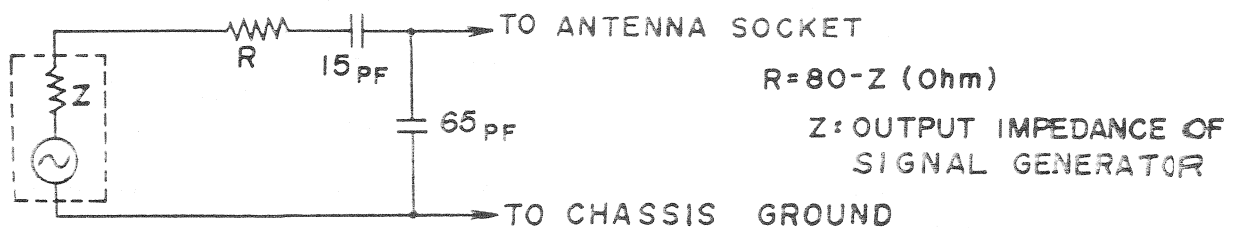


Figure 1 AM Dummy

FM ALIGNMENT CHART

SIGNAL GENERATOR			RECEIVER		ADJUST- MENT
STEP	CONNECTION TO RECEIVER	INPUT SIGNAL FREQUENCY	DIAL SETTING	REMARKS	
1	Connect signal generator through a 1000PF capacitor to converter emitter, test point 1 of Q 2. Connect generator ground lead to the receiver chassis.	Exactly 10.7MHz (400Hz, 30%, FM modulated)	Tuning gang fully closed. (maximum inductance)	Connect VTVM (0.1 volt range DC scale) between TP2 and chassis ground.	T4 T3 T2 T1
2	Same as Step 1.	Exactly 10.7MHz (unmodulated)	Same as Step 1.	Connect VTVM (0.1 volt range DC scale) between TP3 and chassis ground. (See NOTE A)	T6 T5
3	Connect signal generator through a dummy including output impedance of signal generator to the external antenna coil lug. Ground lead of generator to the receiver chassis. (Refer to Figure 2)	Exactly 87.5MHz (400Hz, 30%, FM modulated)	Same as Step 1.	Adjust for maxi- mum output at speaker voice coil.	C3
4	Same as Step 3.	Exactly 108MHz (400Hz, 30%, FM modulated)	108MHz	Same as Step 3.	C1
5	Repeat steps 3 and 4 until no further improvement is obtained.				

NOTE: 1. Adjust T6 so that a VTVM points 0 at volts.

2. Change signal generator frequency 10.7MHz +100kHz and -100kHz approx.

3. Adjust T5 for balanced peaks. Peak separation should be approx. 200kHz.

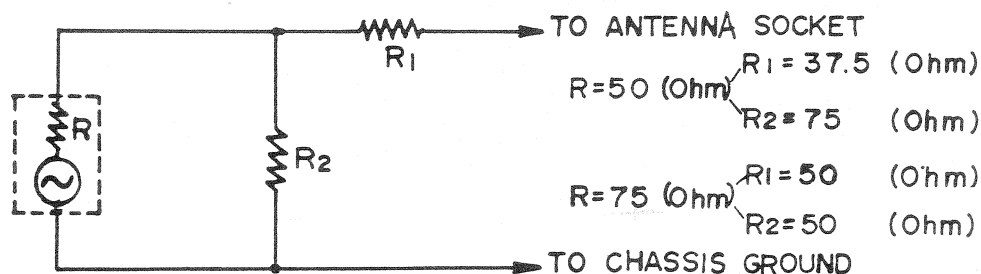


Figure 2 FM Dummy

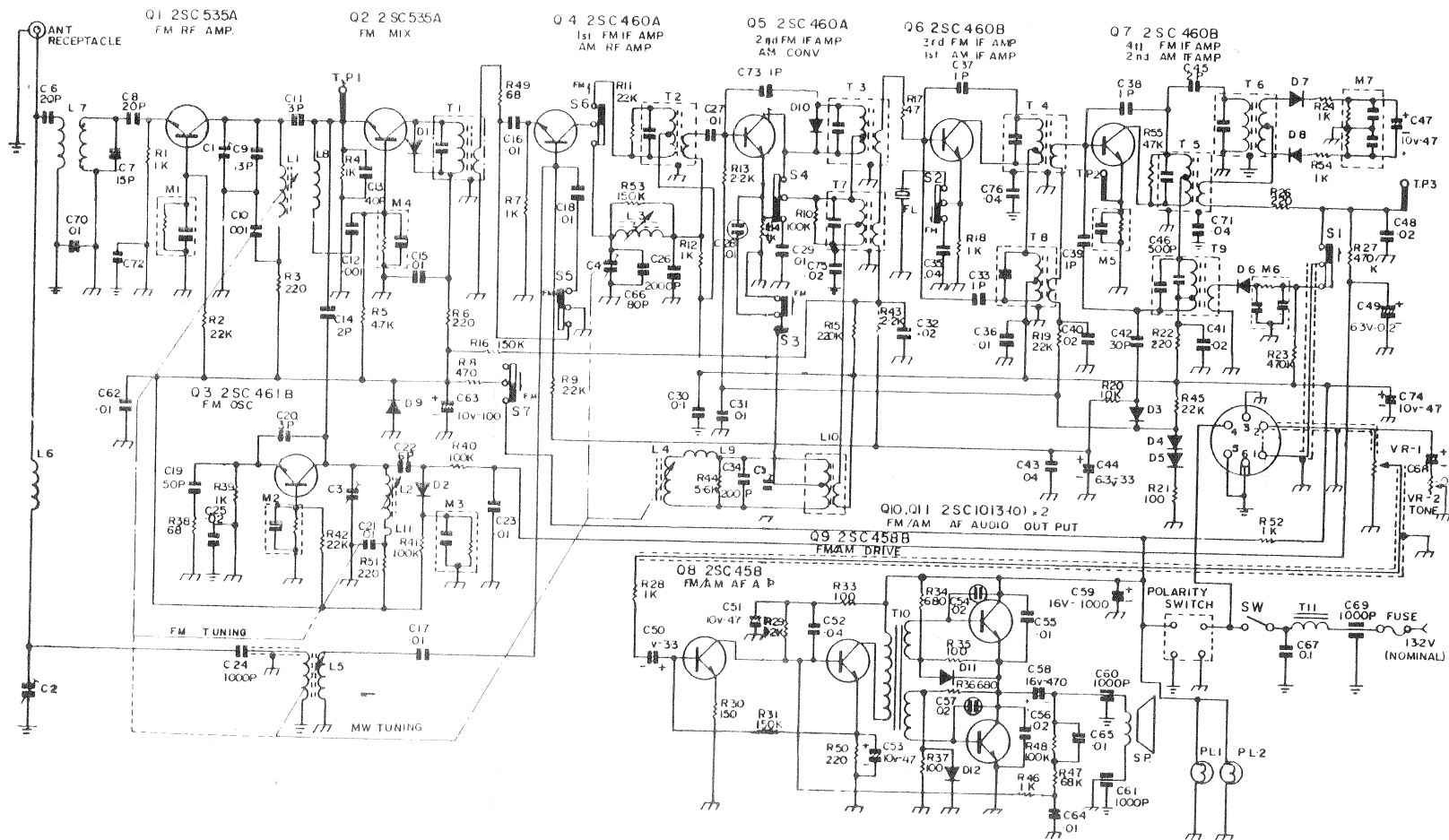


Figure 3 Schematic Diagram

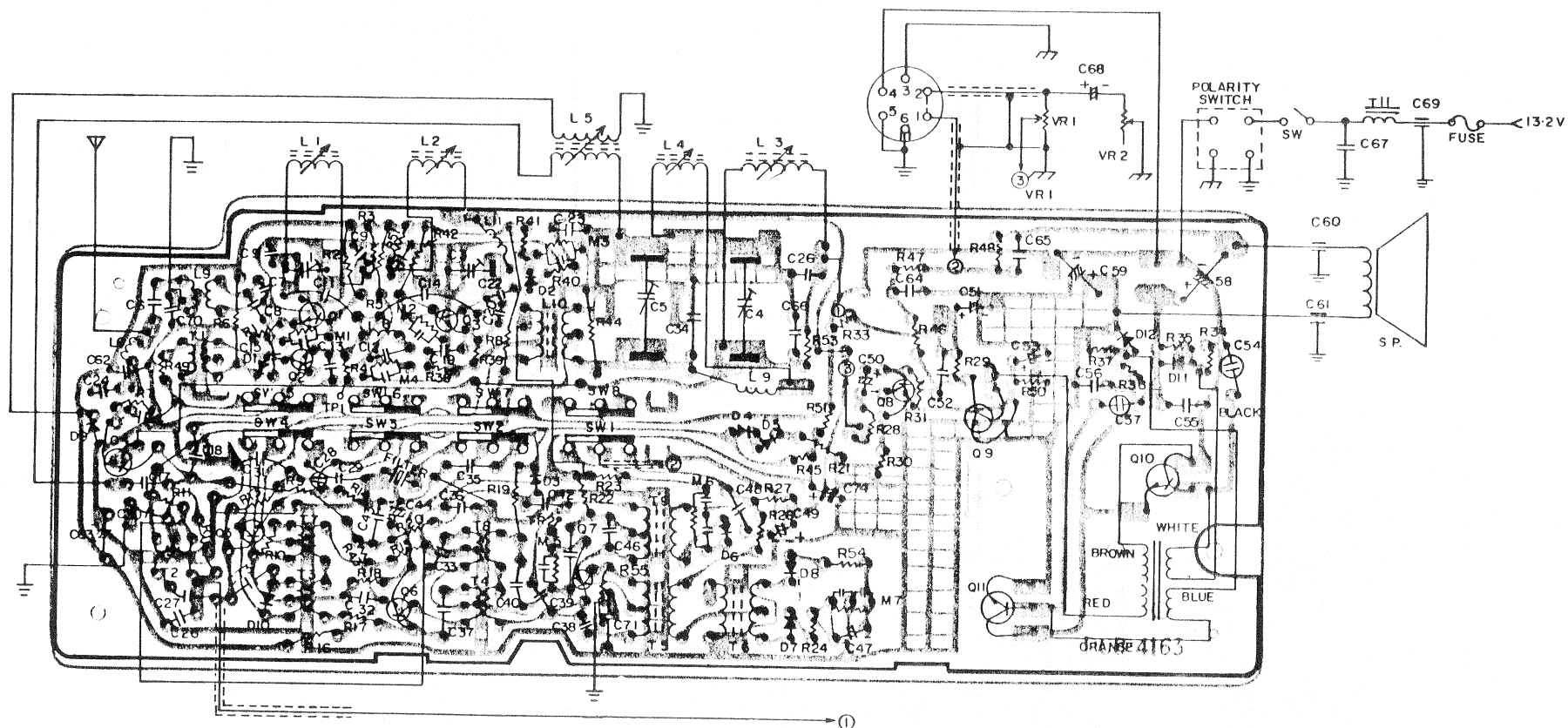


Figure 4 Printed Circuit Board (Bottom View)

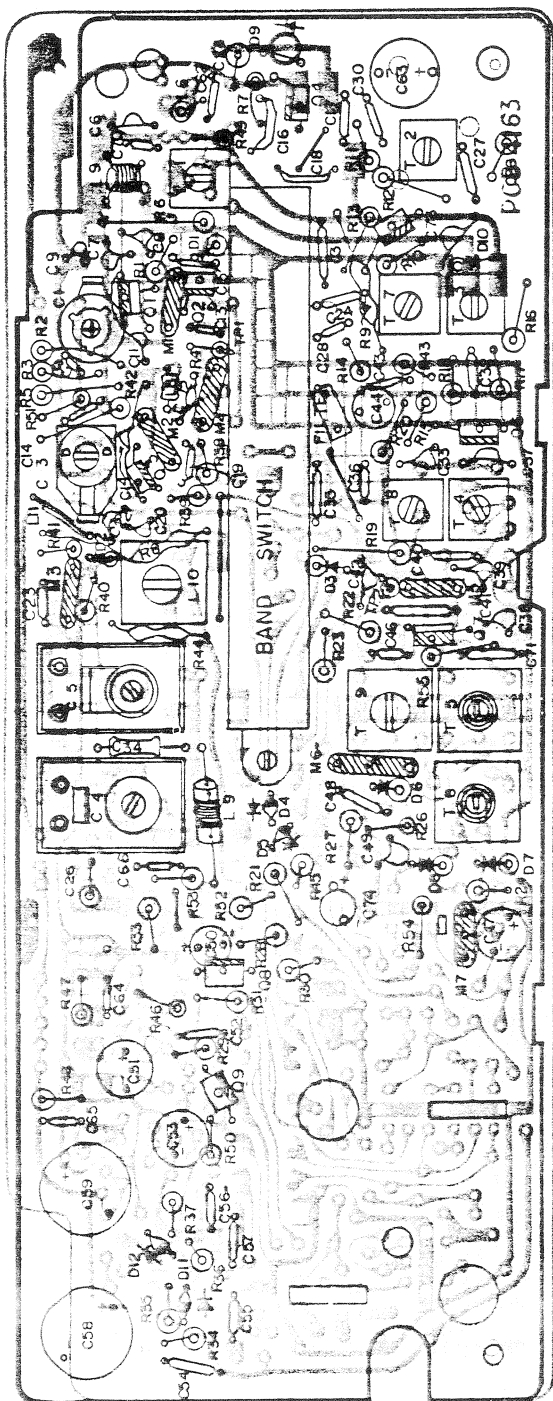


Figure 5 Printed Circuit Board (Top View)

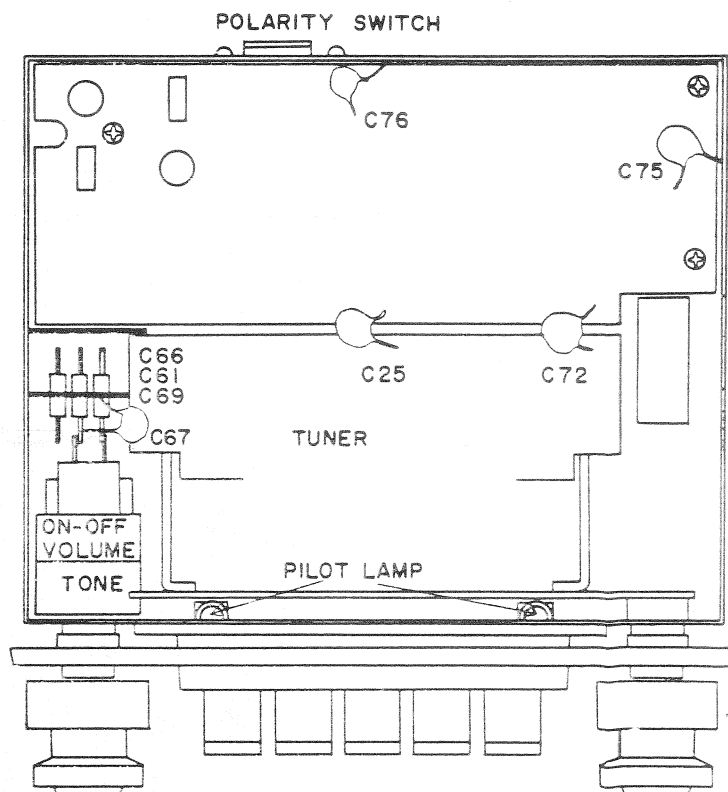


Figure 6 Chassis Layout

PARTS LIST

REF.NO.	PART NO.	DESCRIPTION
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RESISTORS

R1, R7, R12, R14, R18, R24, R28, R39, R46, R52, R54	1545210229	1 K ohm (1/8SU-1KK)
R2, R11, R42	1545222329	22K ohm (1/8SU-22KK)
R3, R6, R22, R26, R50, R51	1545222129	220 ohm (1/8SU-220K)
R4	1544210229	1K ohm (1/8SA-1KK)
R5	1545247229	4.7K ohm (1/8SU-4.7KK)
R8	1545247129	470 ohm (1/8SU-470K)
R9, R13, R19, R43, R45	1545222229	2.2K ohm (1/8SU-2.2KK)
R10	1545210421	100K ohm, 1/4W, 10%, Carbon (1/4SU-100KK)
R15	1545222429	220K ohm (1/8SU-220KK)
R16, R53	1545215429	150K ohm (1/8SU-150KK)
R17	1545247029	47 ohm (1/8SU-47K)
R20	1545210329	10K ohm (1/8SU-10KK)
R21, R33, R35, R37	1545210129	100 ohm (1/8SU-100K)
R23	1545247429	470K ohm (1/8SU-470KK)
R27	1544247429	470K ohm (1/8SA-470KK)
R29	1545282229	8.2K ohm (1/8SU-8.2KK)
R30	1545215129	150 ohm (1/8SU-150K)
R31	1545233329	150K ohm (1/8SU-150KK)
R34, R36	1545268129	680 ohm (1/8SU-680K)
R38, R49	1545268029	68 ohm (1/8SU-68K)
R40, R41, R48	1545210429	100K ohm (1/8SU-100KK)
R44	1545256229	5.6K ohm (1/8SU-5.6KK)
R47	1545268329	68K ohm (1/8SU-68KK)
R55	1544247329	47K ohm (1/8SA-47KK)

* Unless otherwise specified resistors are 1/8W, 10%, carbon type.

CAPACITORS

C1	1560283900	Trimmer, FM Antenna (TO-839)
C2, C5	1560282700	Trimmer, AM Antenna Oscillator (TO-827)
C3	1560270500	Trimmer, FM Oscillator TO-705
C4	1560284600	Trimmer, AM RF (TO-846)
C6, C8	1552220817	20PFD, 50V, 5%, Discap (D-5-208J)
C7	1552215817	15PFD, 50V, 5%, Discap (D-5-158J)
C9	1552213817	13PFD, 50V, 5%, Discap (D-5-138J)
C10, C12	1552601300	.001 MFD, 50V, Discap (D-5-106P)
C11	1552230917	3PFD, 50V, \pm .25PFD, Discap (D-5-309C)
C13	1552240817	40PFD, 50V, 5%, Discap (D-5-408J)
C14, C45	1552220917	2PFD, 50V, 5%, Discap (D-5-209J)
C15, C16, C17, C18, C21, C23, C27, C29, C36, C55, C62, C64, C65, C70	1552608100	.01MFD, 25V, Discap (D-2.5-105Z)

REF.NO.	PART NO.	DESCRIPTION
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C19	1552250817	50PFD, 50V, 5%, Discap (D-5-508J)
C20	1657643300	3PFD, 50V, 5%, Discap (DUJ-5-309J)
C22	1657642700	6PFD, 50V, 5%, Discap (DVK-5-609J)
C24, C26	1558210617	1000PFD, 50V, 5%, Styrol (S-5-106J)
C25, C32, C40, C41, C48, C56, C75	1552608300	.02MFD, 25V, Discap (D-2.5-205Z)
C28	1556210537	.01MFD, 50V, 20%, Mylar (ML-5-105M)
C30, C31, C67	1552201400	.1MFD, 25V, Discap (D-2.5-104Z)
C33, C37, C38, C39, C73	1552210922	1PFD, 50V, Discap (D-5-109C)
C34	1657633700	200PFD, 50V, 5%, Discap (TTH-5-207J)
C35, C43, C52, C71, C72, C76	1552607900	.04MFD, 25V, Discap (D-2.5-405Z)
C42	1552230817	30PFD, 50V, 5%, Discap (D-5-308J)
C44	1661233211	33MFD, 6.3V, Electrolytic (CU-06-332Q)
C46	1552250717	500PFD, 50V, 5%, Discap (D-5-507J)
C47, C51, C53	1661247212	47MFD, 10V, Electrolytic (CU-1-472Q)
C49	1658310411	.1MFD, 6.3V, 20%, Electrolytic (AD-06-104M)
C50	1661233313	3.3MFD, 16V, Electrolytic (CU-1.6-333Q)
C54, C57	1556220537	.02MFD, 50V, 20%, Mylar (MI-5-205M)
C58	1661247113	470MFD, 16V, Electrolytic (CU-1.6-471Q)
C59	1661210043	1000MFD, 16V, Electrolytic (CU-1.6-100Q)
C60, C61, C69	1559294100	.001MFD (CP-8)
C63	1661210112	100MFD, 10V, Electrolytic (CU-1-101Q)
C66	1552280817	80PFD, 50V, 5%, Discap (D-5-808J)
C68	1658320411	.1MFD, 6.3V, 20%, Electrolytic (AD-06-104M)
C74	1661247212	47MFD, 10V, Electrolytic (CU-1-472Q)

PACKAGED CIRCUITS

M1, M2 M3	1656632400	Capristor (PRC-324)
M4	1656631900	Capristor (PRC-319)
M5	1656630600	Capristor (PRC-306)
M6	1656630300	Capristor (PRC-303)
M7	1656633300	Capristor (PRC-333)

COILS AND TRANSFORMERS

L1, L2, L3, L4, L5	1565292600	Coil, Tuning (SPT-926)
L6	1507292000	Coil, Antenna Choke (7L-920)
L7	1508212800	Coil, Antenna (8L-128A)
L8	1507292500	Coil, FM Choke (7L-925)
L9	1507290600	Coil, MW Oscillation (7L-906)
L10	1507249000	Coil, MW Oscillation (7L-490B)
L11	1508233500	Coil, FM Oscillation (8L-335B)

PARTS LIST

REF.NO.	PART NO.	DESCRIPTION
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T1	1507275000	Transformer, 1st FM IF (7IF-750)
T2	1507275000	Transformer, 2nd FM IF (7IF-750)
T3	1507283500	Transformer, 3rd FM IF (7IF-835)
T4	1507283500	Transformer, 4th FM IF (7IF-835)
T5	1507282000	Transformer, 5th FM IF (7IF-820)
T6	1507282100	Transformer, FM Detector (7IF-821)
T7	1507283600	Transformer, 1st AM IF (7IF-836)
T8	1507283600	Transformer, 2nd AM IF (7IF-836)
T9	1507280100	Transformer, 3rd AM IF (7IF-801)
T10	1516282600	Transformer, Audio Input (6T-826)
T11	1519273800	Transformer, Choke (9T-738)

SEMICONDUCTORS

Q1	1522222710	Transistor, FM RF (2SC535A)
Q2	1522222710	Transistor, FM Mixer (2SC535A)
Q3	1527210721	Transistor, FM Oscillation (2SC461B)
Q4	1527210811	Transistor, 1st FM IF Amplifier & AM Amplifier (2SC460A)
Q5	1527210811	Transistor, 2nd FM Amplifier & AM Convertor (2SC460A)
Q6	1527210821	Transistor, 3rd FM IF Amplifier & 1st AM IF Amplifier (2SC460B)
Q7	1527210821	Transistor, 4th FM IF Amplifier & 2nd AM IF Amplifier (2SC460B)
Q8	1522223720	Transistor, FM, AM RF Amplifier (2SC458B)
Q9	1522223720	Transistor, FM, AM Driver (2SC458B)
Q10, Q11	1527217203	Transistor, FM, AM Power Output (2SC10130)
D1	1522270101	Diode, FM Limiter (1N34A)
D2	1527271001	Diode, FM AFC (1S352M)
D3	1522270101	Diode, AM AVC (1N34A)
D4, D5	1527270206	Diode, Regulator (HV-23)
D6	1522270101	Diode, AM Detector (1N34A)
D7, D8	1522270208	Diode, FM Detector (1N60)
D9	1527271301	Diode, Zener (1S1715)
D10	1522270201	Diode, FM Limiter (1N60)
D11, D12	1527272601	Diode, Varistor (MV-1)

REF.NO.	PART NO.	DESCRIPTION
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MISCELLANEOUS

1119259853	Cabinet, Body (X9CAB4163A)
1119259953	Cabinet, Bottom (9CAB-4163B)
11062827	Decoration Panel (PANEL-4144)
11092394	(9K-394)
11092395	Knob, On-Off Volume, Tuning Tone (9K-395)
11213743	Dial (DIAL-4163)
11232848	Dial, Plate Front (DIAL-P4163A)
11232849	Dial, Plate Back (DIAL-P4163B)
11332343	Decoration Metal (DEC-M-4144)
11362712	Decoration Panel (DEC-P4144A)
11362713	Decoration Panel (DEC-P4144B)
1320295000	Socket, Polarity Switch (SO-950)
1323216900	Plug, Polarity Switch (PG-169)
1303236500	Printed Circuit Board (PCB-4163)
1320200300	Din. Socket (SO-003)
1320204500	Socket, Ext. Ant. (SO-045)
1324292700	Fuse Holder (FH-927)
1330281651	Radiator (XHON-P4163)
1533261700	Band Selector Switch (36S-17)
1548284400	Volume (8V-844)
1565292600	Tuner (XSPT-926)
1575201200	Speaker Box (XCP-12)
1590280100	Ceramic IF Filter (452kHz) (FILTER)
1593230200	Fuse (3FUSE-1.2A)
1593250300	Pilot Lamp (3PL-503)